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# ***JPRS Report***

# **Science & Technology**

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***CHINA: Energy***

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# Science & Technology

## China: Energy

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**May Energy Figures Released**  
*40100056d Beijing CEI Database in English 19 Jun 89*

[Text] Beijing (CEI)—Following is a list of China's total output of primary energy production in May 1989, released by CSICSC [China Statistics Information Consultancy Service Center]:

Item	Unit	1-5/89	5/89	Percentage over 1-5/89
Total output (10,000 tons of standard coal)		38,535.0	8,648.0	105.1
A. Raw coal	10,000 t	39,246.0	8,892.0	106.4
including:				
Output under unified central planning	10,000 t	19,261.0	4,139.0	104.3
B. Crude oil	10,000 t	5,604.2	1,154.9	100.1
C. Natural gas	100 million cubic meters	61.44	12.89	102.1
D. Hydropower	100 million kWh	416.3	117.8	110.5

**Northwest Aims To Become Major Energy Base**  
*40100059 Beijing CHINA DAILY in English 10 Jul 89*  
*p 4*

[Text] All eyes follow the investment flow, when foreign gold pours into the eastern provinces and coastal areas.

All are impressed to see Shenzhen, the country's first Special Economic Zone, rising from wasteland to a modern city within ten years. And Hainan Island too holds the attention in all its tropical splendour as it starts its own transformation as the largest Special Economic Zone.

These are the places where it all appears to be happening in China. Few even stop to think about the far-away Northwest, a region seen as strange and remote even to many Chinese.

But this could well prove a very shortsighted view for many experts are now predicting that the Northwest will probably become the most important base of the country's economy in the 21st century.

This is because the East, where most of the best-equipped industries are located, has already felt the sharp bite of shortages in raw materials, coal and electricity. This in part arises because of a lack of local natural resources, holding up the smooth development of the economy.

By contrast, when the facts are known, the Northwest can be seen as a veritable treasure house.

It includes Shaanxi, Gansu and Qinghai provinces and the Xinjiang Uygur and Ningxia Hui autonomous regions.

With a population of about 80 million people, including many minority nationalities, the Northwest occupies one-third of the country's total land area with one-third of that under cultivation.

The region has about 97 percent of the proven mineral resources, while it is also rich in underground water and hydro-electricity resources.

In Shaanxi and Ningxia, proven coal deposits are about 20 percent of the country's total. And coal deposits in Xinjiang are believed to be about 35.7 per cent of the country's total, according to a report by PEOPLE'S DAILY.

Oil resources are also abundant. Apart from the oil fields of Karamay and Kekaya in Xinjiang; Yumen in Gansu; Lenghu in Qinghai; and Yanchang in Shaanxi, there are also possibilities of even greater fields in Xinjiang's Junggar and Tarim basins still waiting to be exploited.

About 118 of the country's 147 kinds of ferrous and non-ferrous metal minerals have been found in Xinjiang.

In Gansu, nickel deposits make up about 72 percent of the country's total, the largest not only in China, but also in the world.

Salt deposits in Qinghai's Qaidam Basin are believed to total 50 billion tons, enough to last the whole world for 100 years.

On the upper reaches of the Yellow River, China's second largest after the Yangtze, hydro-electric resources are huge, with a capacity for 15 hydro-power stations.

Since the 1950s, five hydro-power stations have been built. They are at Liujiaxia, Yanguoxia, Bapanxia, Qingtongxia and Longyangxia, with an annual electricity generating capacity of more than 3 million kilowatts in the upper reaches.

## NATIONAL DEVELOPMENTS

Within the 1,023 kilometres from Longyangxia to Qingtongxia, another 10 hydro-power stations can be built with an annual generating capacity of 10 million kilowatts.

These power stations could not only provide enough electricity for industrial and household use in the whole of the Northwest, but other parts of the country as well.

In addition to water from melting snow and ice on the high mountains in the Northwest, a large "underground sea" with an estimated more than 10,000 cubic metres of water has been discovered in Gansu.

It is also said that the underground water in Qinghai's Qaidam Basin is as much as that of four Qinghai lakes. The Qinghai Lake is the largest inland salt lake in the country.

It all adds up to the fact that the Northwest is not such a bleak and desolate place as many people who have never been there have imagined.

Over about 40 years, many industrial cities have been established, such as Xi'an in Shaanxi; Lanzhou in Gansu and Urumqi in Xinjiang.

The 500-kilometre electric railway project from Baoji of Shaanxi to Lanzhou, in Gansu Province, has nearly been completed.

Now, the total length of highways in this area reaches about 120,000 kilometres, while there are about 80 air service lines reaching every part of the country. Since 1979 when the country first adopted the open policy, the five provinces and autonomous regions in the Northwest have attracted \$1.6 billion from investors in Japan, the United States, France and Hong Kong and set up more than 100 Sino-foreign joint ventures.

Industrially advanced provinces in the eastern part of the country have signed more than 20,000 economic co-operation contracts with the Northwest in the past few years. Enterprises in the petro-chemical, machinery, weaving, electronics and non-ferrous metal industries now total more than 24,000 in the region.

There is also a strong military industry, ranging from airplanes, trucks, and electronic products in the region. But what is perhaps even more important is that in the Seventh-Five-Year-Plan Period (1986-90), the central government for the first time decided that the Northwest be designated an important development area, aiming to develop agriculture, animal husbandry, transport, energy and mining. This would be preparing the Northwest to leap forward in the next century.

**Power Industry Output Drops in June**  
*40100058c Beijing XINHUA in English 0048 GMT  
28 Jun 89*

[Text] Beijing, 28 Jun (XINHUA)—Energy production in China increased slightly in the first 6 months of this year but the daily output in the power industry began to drop early this month, CHINA DAILY reported today.

Although the power output rose 8.3 percent in May from a 0.13 percent reduction in January, power plants throughout the country did not reach the planned daily target of 1.56 billion kilowatt-hours for 13 days in June, due to the turmoil, the newspaper quoted a spokesman from the Ministry of Energy Resources as saying.

The power output dropped to 1.47 billion kilowatt-hours on 8 June, the minimum daily output over the past 5 months.

The maximum daily output reached 1.6 billion kilowatt-hours in May. In that month alone China generated 48.6 billion kilowatt-hours.

The thermal power plants in east and south China could not get enough coal in the past month for electricity generation so the power output there has decreased, the spokesman explained.

In the northeast, hydroelectric power stations had to cut their output because of water shortages in reservoirs.

Up to the middle of June, he said, China had produced 260.84 billion kilowatt-hours of electricity, a 5.28 percent increase over the same period last year.

By 10 June, China had turned out 416 million tons of coal, representing 42.24 percent of the state plan and increasing 9.06 percent over the same period last year.

The state-run coal mines produced 205 million tons, an increase of 4.48 percent over last year. This record has exceeded the growth rates over the past few years.

The spokesman said the output growth rate was a bit higher in the coal-starved area in northeast China than in the rest of the country. The northeast China coal development company took the lead in coal production in the northeast provinces.

In the first 5 months, the company produced 48.41 million tons, 3.77 million tons more than the state target. This accounted for 33 percent of the increase in production of the state-run coal mines.

The output in nine major coal mines in east China has increased by 200,000 tons.

Crude oil production slightly increased by 0.4 percent to 56.17 million tons in the first 5 months, fulfilling almost 40.5 percent of the year's target.

The spokesman added that the daily oil output in the country's main oil fields has been kept at a level of 370,000 tons.

**Installation of Generating Units Hits Delays**  
*40100058b Beijing XINHUA in English 1354 GMT  
29 Jun 89*

[Text] Beijing, 29 Jun (XINHUA)—China has planned to complete the construction of 48 generating units with a total capacity of 7.9 million kilowatts this year to ease the electricity strain.

According to the Capital Construction Department under the Ministry of Energy Resources today, the planned projects include 37 thermal power generators with a capacity of more than 7 million kW and 11 hydropower generators with a capacity of 850,000 kW.

Sources say that up to the end of the first half of this year, 13 units have been completed, with a capacity of 1.5 million kW, only 19.1 percent of the planned annual target.

A spokesman for the ministry attributed the slowdown of the construction to the delayed delivery and quality problems of some imported equipment and banks' arrears of the capital planned for the projects.

The ministry has called [upon] local banks to provide necessary funds.

**Longyangxia Power Station Now Fully Operational**

40100056c Beijing XINHUA in English 0107 GMT  
17 Jun 89

[Text] Xining, 17 Jun (XINHUA)—The Longyangxia hydroelectric power station, the largest of its kind on the Yellow River, went into full operation with the completion of its fourth generating unit Thursday.

Construction of the power station began in 1976. It has a combined installed capacity of 1.28 million kW.

The power station has produced 1.3 billion kWh of electricity since the first generating unit went on stream in 1986.

**Scientists Urge Construction of More Hydropower Stations**

40100057a Beijing XINHUA in English 0625 GMT  
22 Jun 89

[Text] Beijing, 22 Jun (XINHUA)—China should build more hydroelectric power stations as a way to solve its shortage of electricity, scientists said here recently.

At a meeting held by the Chinese Association of Science and Technology not long ago, experts from the Ministry of Energy and the Ministry of Water Resources proposed that the Chinese Government take workable measures to boost the development of hydroelectricity.

They suggested that by the end of this century China should have 50 million kW more hydroelectric power than at present, construction of new hydropower stations of a total of 55 million kW should be started, and feasibility studies on large and medium-sized hydropower stations totaling 100 million kW should be completed.

Statistics show that China's hydropower resources rank first in the world, with a potential of 1,900 billion kWh. However, by the end of last year, China only had 108 billion kWh of annual hydroelectric power production.

According to an official from the Ministry of Energy, in the next decade China is to build large and medium-sized hydropower stations with a total [installed capacity] of 45 million kW, as well as small hydropower stations with a total [installed capacity] of 14 million kW. Most of the stations will be built along the upper reaches of the Yellow River, and the upper and middle reaches of the Yangtze River.

**Energy Minister Views Coal Production**  
*40130102 Beijing JINGJI RIBAO in Chinese 7 Jun 89*  
*p 1*

[Article by staff reporter Xie Ranhai [6200 3544 3185]: "Way Out for Coal Production—Record of an Interview With Minister of Energy Huang Yicheng"]

[Text] Since last year, shortages on all the fronts of coal production have caused a general concern among the countrymen. How the development of coal industry be speeded up and the production of coal be increased? Minister of Energy Huang Yicheng, on the basis of vast amounts of surveys and investigations in the present coal industry, has put forward his new policy. The reporter talked with the minister concerning the above-mentioned problems.

**Reporter:** During the period—in March this year—in which the national work conference for coal production safety was being held by the Energy Department, Premier Li Peng stated, at a meeting with the conference delegates, that the chief missions for coal industry for this year and the next are to raise the safety standards in coal production to a new level; and coal production volume must reach, or exceed 1 billion tons 1 year ahead of the schedule. To complete these two challenging missions, apart from increasing inputs in the coal industry, which line of work, in your opinion, should be focused on?

**Huang:** The management level of the coal industry, the quality of the working force, and the safety work and safety monitoring system, all of them, need considerable improvement, or, to put it this way, they need to move into a new stage. That is to say, we must raise the coal production efficiency and reduce casualties of staff members through a strengthening of enterprise management.

**Reporter:** By raising efficiency, does it mean—as repeatedly mentioned by you on many occasions—the two main tasks of simplifying and streamlining the administrative structure and tightening the organization, and on the other hand promoting new technology and raising the level at which coal production is mechanized?

**Huang:** Yes. One common malady in our organs and enterprises is the large number of organizations, with hair-splitting divisions of labor and the large number of deputy posts. It is also one of the important reasons for our low work efficiency. A relatively wide range of issues are involved in this problem, and the degree of difficulty in reforming it is great. But if no improvement is made, it will be very hard to raise in any considerable degree the work efficiency.

I do not yet have any specific ideas concerning organizational arrangement. But the present situation—a bureau chief or the chief of a mine unit directly supervising 20 or more section or administrative offices—is

not workable in any case. It is possible that the administration can be streamlined, such as one bureau chief or the chief of a mine being responsible for three to four department heads, who in turn supervise another three or four—that is one tier reporting directly to another. In particular, for companies and organs within the bureaus it is advisable not to set up the deputy post, so if anything goes wrong the bureau chief is the one who is responsible. I have been to Lubuge [7627 1580 7245]. The Japanese undertake a large-scale project there and they assign only one controller for the project. There is no deputy controller. Under the controller there are six "corps." One corps supervises several foremen. One tier is responsible for another, and it is very efficient. If we are to undertake a project on such a scale, generally we will have to set up a project bureau.

Can we do it the way the Japanese do? We can. From what I have learned from the Tiefa Mineral Affairs Bureau, there is only one engineering section in the bureau. Previously there were 13 cadres at the mine- and office-level. After they practiced the contract system the number of cadres went down to four, but the work efficiency has gone up. I hope comrades with a reform spirit can look into this direction and find a new path.

What do we do with the extra number of cadres after the streamlining and reduction of personnel? We have to strengthen the cadre force at the basic level. We can mobilize a certain number of technical cadres to work as foremen. But they must be given political status and high wages. For the rest of the extra number of cadres new battlefields will have to be opened for them. Revolving around coal production, we may practice "majoring in one industry and diversifying our operations," which will provide them an opportunity to give play to their talents and create wealth for the country.

In aspects of raising the level at which coal extraction is mechanized, over the last 10 years, we have focused on promoting the combined mechanized coal extraction method, and now its superiority is shown in full. At present, there are over 200 projects done in combined mechanized coal extraction at centrally regulated coal mines across the country. The total coal production volume from the 400 combined mechanized coal extraction systems has exceeded that from centrally regulated mines by one quarter. Practice has shown that the promotion of combined coal extraction has done a great deal of good for us in stabilizing production, tackling the safety problems, expanding production volume and reducing the number of staff personnel. Of course not every coal mine needs to take up the combined coal extraction method. Coal mines not in a position to adopt the method may still rely on ordinary coal extraction method or its high-capacity counterpart. Extraction by blasting should be avoided as far as possible.

Per unit area yield is still a problem for the combined extraction method. At present, the 2d brigade in Gushuyuan in Jincheng is the best combined extraction brigade, whose production volume last year reached 1.8

million tons. But the national production level did not top 1.5 million tons. Of course, conditions vary, and there are the problems of adopting earlier or later the combined extraction method. But the potential is there. I hope those combined extraction brigades equipped with better conditions can push up the production volumes this year and multiply the records of exceeding 1 million tons in production by combined extraction method.

**Reporter:** In the last few years, there has been much improvement in the coal production safety aspect across the country. A great deal of arduous and excellent work has been done by the mass of workers in the raw-coal departments and on the battleline of coal production. The results have been great. Across the country, there are a number of coal mine bureaus which have achieved a less-than-one person mortality rate for 1 million tons of production, and have attained the condition in which no deaths are recorded for several hundred working days in a row. There are even some coal mines where there is not a single death case. But, compared with the coal mines in advanced countries, ours still lag a great distance behind. In the matter of production safety, we lag even behind India. What will the Energy Department do to improve work in this aspect?

**Huang:** The Energy Department does give very serious attention to coal production safety. The first important work grappled by the department immediately after its establishment was the issuance of "Energy Department's Directive for Production Safety (Number 1)." As its department head, I am directly responsible for the Head of Safety and Environmental Protection and the safety work.

Over many years, we have paid dearly in the aspect of production safety. But we summed up the experience and have set up a practical, workable safety system. Of course some of the rules and systems remain to be perfected in the process of practice. Still, it is worth our attention that, judging from some of the serious accidents, quite a number of them were caused by negligence, insufficient alertness, carelessness and violation of rules in operation. This should compel us to think deeply. It is a fact that the safety regulations need improvement and correction, but the key lies in their enforcement. Workers must be made aware of the existing rules and procedures, and thereby their consciousness of observing the safety rules and procedures can be heightened. There is one more thing: We must put up strict requirements and discipline. In this matter, the first thing is that our leading cadres must have the fortitude to exercise their authority. In particular, the superiors must back the cadres under them: Bureau chiefs should support mine chiefs, who in their turn should support the brigade leaders. With one level supporting another under it, people will then have the courage to struggle against the habits of not observing or breaking the discipline. Anyone who breaks a rule will be punished and there is to be no exception. This is in fact

a show of a genuine concern for workers. For it is better to make strict requirements and severe criticisms of workers than have accidents and see the workers sent to prison. At any rate if people die in an accident the threat of jail will make no difference; people will be dead anyway.

**Reporter:** The state has suggested that the coal mines should employ more labor on a rotary, temporary and contractual basis, and should adopt regular rotations for coal miners. But given the fact that, since the beginning of this year, a vast number of non-regular laborers have left the coal mines, and the fact that the level of mechanization at the coal mines remain to be improved, many comrades have put forward the idea that in enforcing the policy of employing more temporary labor some improvement should be made, so that the coal miner force can become relatively stable. What is your opinion on this point?

**Huang:** Viewed in general, the adoption of a rotation system for coal miners is correct in its direction. It carries many good points: First, as coal miners working in rotations do not work long hours in a coal well, there are fewer chances for them to fall victim to occupational diseases. Second, the state may save much investment as the state does not need to build dormitories, child nurseries and schools for the family members of temporary coal miners, nor is it necessary for the state to take care of them after their retirement. Somebody has calculated that the state will have to spend 40,000 yuan a year on a regular coal miner, and wages and bonuses account for only a small portion of this amount. Now the state needs to pay only wages and bonuses to workers on the rotary basis. Third, the rotation system may develop some talents in the rural areas. Having worked in a modernized coal mine for several years, acquired some technical knowledge and "seen the world," a worker on the rotary basis will be an asset in changing the face of rural area when he returns to his home village. I think this policy is correct.

Of course, the coal mines must keep a part of coal miners as the backbone. For them there can be no rotations, particularly when the coal mines today are working toward mechanization. It will be difficult to maintain stable production if all of the coal miners are contract labor. Apart from contract labor, consideration can be given to the idea that in the future, one regular laborer will lead one or two contract laborers and they will form a unit, like veteran soldiers tutoring fresh ones in wartime periods. A coal miner on the rotary basis must receive training for at least 3 months and must pass an examination before he goes down a coal well. He should obtain the same amount of wage for an equivalent amount of work. His wage is calculated on a piece-rate basis, and whatever the amount of it, he will get it. Apart from this, there should be labor insurance compensation, which can be saved on a monthly basis and its total sum, when the contract expires, will be given to the contract laborer. That is to say, the amount—normal wages plus

the compensation—will exceed that earned by regular laborers. Otherwise nobody will be willing to work as a temporary coal miner or one on a rotary basis. There must be a policy of encouragement, which will help stabilize the underground coal-digging force. Moreover, a part of coal miners on a rotary or temporary basis, if they are willing to study hard to acquire the technique, and if their level of political behavior is up to the standard, then, having passed a strict examination, they can be promoted to regular workers. But the number of promotions cannot get beyond 10 or 15 percent.

In concluding the interview, Minister Huang Yicheng said, to sum up all that is mentioned above, the two statements I made at the establishment of the Energy Department still apply: The energy industry must develop. With what means can it be developed? By relying on reform and policy. We must rely on reform and policy to push for a quicker development in the energy industry. Relying on reform and policy, we can raise the labor productivity and efficiency for the energy industry.

**Despite Domestic Shortages, Coal Exports Reported Up**  
*40100061 Beijing CHINA DAILY in English 21 Jul 89 p 2*

[By staff reporter Yuan Zhou]

[Text] The China Coal Import and Export Co., Ltd. (CCIEC), the exclusive foreign trader of coal, exported 6.56 million tons of coal worth \$228 million in the first half of this year.

According to officials with CCIEC, its export of coal was 0.76 percent more than the same period last year, and accounted for about 1.02 percent of the value of the total Chinese national foreign trade.

But there was a difference between the CCIEC and the customs figures.

According to the General Administration of Customs, China exported a total of 5.7 million tons of coal, 668,000 tons of coke, and 10.8 million tons of crude oil in the first half of this year.

At the same time, 900,700 tons of coal and 811,000 tons of crude oil were imported.

While coal exports dropped by 12.6 percent, import of coal and crude oil increased by 12.6 percent and 545.3 percent respectively, according to the customs report.

"We don't know why there is such a difference in figures about coal exports, but we believe our figures are correct," a CCIEC official said.

The CCIEC officials admitted that the export of coal had been affected by such difficulties as overall domestic coal shortages, cramped transport conditions and poor faith in honour contracts.

Not until June did an upturn occur for coal exports, compared with last year, CCIEC officials say.

The customs figures show that in June alone, the nation exported 962,000 tons of coal.

The CCIEC used to handle the bulk of the Chinese coal export. Last year, it exported 14 million of the total 16.2 million tons of Chinese coal. But this year, it takes over all exporting and importing of coal.

The country has planned to earn \$528 million by exporting 16 million tons of coal, 260,000 less than last year.

Some Chinese officials predict that if the country maintains its present level of coal exports, the total coal exports may equal or even exceed that of last year.

**Coal Production Sees Increase in First Half**  
*40130112c Beijing RENMIN RIBAO in Chinese  
26 Jun 89 p 2*

[Report by Shang He [1424 4421] and Wen Xing [2429 2502]]

[Text] Beijing, 25 Jun—Up to 15 June, the enterprises subordinate to the China Corporation of Coal Mines for Unified Distribution had achieved good results in safe production and had fulfilled half of the annual production target. They had produced a total of 158.58 million tons of coal and had bored 249,400 meters of tunnels. The accumulated output of dressed coal reached 23.36 million tons. Production safety also improved. In the 10 mining bureaus, including Yanzhou, Xinwen, Jincheng, Jingjing, Zixing, and Hami, no fatal industrial accidents had occurred.

**Six New Mines Put Into Operation**  
*40100058a Beijing XINHUA in English 0756 GMT  
30 Jun 89*

[Text] Beijing, June 30 (XINHUA)—Six new coal mines with an annual production capacity of 2.94 million tons became operational in the first half of this year, an increase of 226 percent compared with that in the same period last year.

According to the Chinese Ministry of Energy Resources, China plans to spend more than 6.56 billion yuan on the construction of 120 coal mines, including 70 new ones, with their combined production capacity of 120 million tons. Of these, 25 with a total capacity of 15.58 million tons are expected to go into operation this year.

Since the beginning of April this year, more money has been allocated to coal mining development and the money for the country's major mine projects has been ensured, according to the ministry.

**Underwater Coal Mining of Huai He**  
*40130097c Tianjin ZHONGGUO JISHU SHICHTANG BAO [CHINA TECHNOLOGY MARKET NEWS] in Chinese 1 Apr 89 p 1*

[Article by Hua Gong [5478 1562]: "Major Breakthrough in Underwater Coal Extraction Techniques in China, Water Surges Above, 'Black Gold' Is Extracted Below, Huainan Mine Safely Extracts Over 10 Million Tons of Coal Beneath the Huai He"]

[Text] After more than 2 years of research and experiment, Anhui's Huainan Mine has safely extracted over 10 million tons of coal from beneath the water and dikes of the Huai He, and they have emerged unscathed from five floods. This is a basic solution to technical problems in underwater coal extraction.

Nearly 100 million tons of coal resources lie buried in the river bottom in part of the Huai He, which traverses the Huainan Mining Region, running from Erdao He to Bagong Shan. The maximum water depth in this section of the river is about 10 meters and the river is normally 300 meters wide. The river is 650 meters wide during the wet season. The maximum flow rate of the river water is 10,800 m<sup>3</sup>/sec. To enable this thick coal source which lies flooded beneath the Huai He to play its role, Huainan Mine has organized forces to attack key technical problems over the past 10 years. The first was a method of leaving water-prevention coal pillars at Lizuizi Mine for successful extraction of coal at a depth of about 100 meters below the riverbed. Next, Lizuizi Mine and

Xinzhuangzi Mine increased the height and breadth of dikes, drilled holes for grouting, and took other dike protection measures to extract coal from beneath the large Huai He dike, with 3,900 meters of the dike being affected by extraction.

General Manager Yu Hong'en [0060 3163 1869] in the China Unified Distribution Coal Mine Corporation recently stated during an on-site inspection that this technology has enabled the old Huainan Mining Region to extract an additional 3 million-plus tons of coal in a year, and it has opened up a new way to increase coal output. He said it has accumulated experience in extracting coal which lies beneath bodies of water, structures, and railroads, and should receive attention.

**New Field Discovered in Western Heilongjiang**  
*40130112b Harbin HEILONGJIANG RIBAO in Chinese 2 Jun 89 p 1*

[Text] According to a preliminary investigation, a coal field has been discovered in an area from Nenjiang County's Heibao Shan to Heihe City's Muerqi Basin. The total amount of coal reserves is estimated at 400 million tons. Of good quality, this coal deposit will completely meet demands for generating power. At the same time, a medium-sized deposit of sodium bentonite has been discovered and verified in this area, thus filling a gap in the province's mineral product inventory. These are the latest investigative results of the second geological prospecting station of the provincial Geological and Mining Bureau. The exploitation of this coal field will help relieve the shortage of coal resources in the province, particularly the western part of the province, will change the situation of transporting coal from the east to the west of the province, and will solve the problem of substituting coal for timber in forest areas.

**Oil, Gas Field Output in First Half Reported**  
*40100060a Beijing CEI Database in English 18 Jul 89*

[Text] Beijing (CEI)—Following is a table of the output of main oil and gas fields in China in the first half of 1989, released by the China Oil and Gas Exploration and Development Corporation.

Oil and gas field	Crude oil (unit: 10,000 tons)	Percentage of annual quota	Gas	Percentage of annual quota (unit: million c.m.)
Daqing	2758.6	49.8	11.04	50.2
Shengli	1627.8	47.2	7.59	52.4
Liaobei	633.9	47.7	8.11	47.7
Zhongyuan	347.2	46.8	7.37	59.0
Xinjiang	308.8	47.5	2.47	
Huabei	268.7	49.3	1.04	45.3
Daguang	197.6	45.9	1.88	52.2
Jilin	167.3	51.8	0.53	
Henan	128.0	50.2	0.27	
Changqing	69.2	50.5	0.11	
Jianghan	46.5	49.0	0.30	
Jiangsu	36.6	52.3	0.17	
Qinghai	35.0	50.0	0.18	
Yumen	26.6	59.1	0.07	
Sichuan	6.6	65.8	30.77	51.3
CNOOC	45.2	50.2		

Note: CNOOC—China National Offshore Oil Corporation

**Daqing Fulfills Mid-Year Oil Quota**

*40100060b Beijing XINHUA in English 1225 GMT  
3 Jul 89*

[Text] Harbin, July 3 (XINHUA)—Daqing, China's leading oil field in Heilongjiang Province, turned out 193 million bbls of oil in the first 6 months of this year, 770,000 bbls more than its half-yearly quota.

An oil field official said this is the 14th year in succession that Daqing's oil production has increased.

In addition to oil production, the oil field has fulfilled its annual natural gas and light hydrocarbon quotas.

**Liaobei Daily Output Hits 35,000 Tons**

*40100057c Beijing RENMIN RIBAO in Chinese  
16 Jun 89 p 4*

[XINHUA report: "Liaobei Oil Field Gives Highest Daily Output of the Year"]

[Text] Shenyang, 15 Jun (XINHUA)—The daily output of crude oil in May was 35,000 tons, a net increase of 700 tons from April and at Liaobei oil field the best recorded since the beginning of the year.

In early June, the Liaobei oil field authorities required all workers and staff to further stabilize production order and to increase crude oil output. The Shenyang Oil Production Works has proposed: Go all out for 30

consecutive days in June to strive for a daily output of 8,000 tons. To realize this target, each party and administrative leading member in this works is responsible for one item of work, and each cadre at and above team and group level has drawn up his own concrete guarantee measures. At present, the target, a daily output of 8,000 tons, has been reached. The No 105 Xucai operation team, which was awarded the honorary title of golden medal team in the national oil system in 1988, has fulfilled the annual production quota 223 days ahead of schedule. The No 2 Oil-Drilling Company has already completed the drilling of 41 wells with precision and quality.

**Yunnan Implements Strict Controls To Ease Oil Shortage**

*40130112a Kunming Yunnan Provincial Service  
in Mandarin 1200 GMT 13 Jun 89*

[Excerpt] A news briefing given by the provincial government yesterday morning revealed that the oil supply-demand contradiction in Yunnan has become very sharp and has affected the province's economic development. Facing such a situation, the provincial government has decided to apply the principle of allocating oil in a unified way, exercising stricter control, broadening sources of oil, practicing economy, reducing consumption and guaranteeing the supply to key projects in a bid to ease the sharp oil supply-demand contradictions.

Relevant sources pointed out: Apart from a gap between supply and demand, the inadequate macroeconomic control over energy-guzzling production and the constantly

rising oil prices following the introduction of the double-track pricing system, have created strains on oil supply. Meanwhile, because of the backward transportation in Yunnan, a large volume of oil allocated to our province according to state quotas cannot be shipped to us. All this has brought about a sharp drop in our oil stocks.

Under such circumstances, the provincial government has decided to set up a special oil leading group headed by Vice Governor Jin Renqing to lead and organize the work of allocating, shipping, and controlling the oil supply. It also called on governments at different levels and the departments concerned to strengthen their leadership over the work of purchasing, marketing, allocating, and stocking oil in a coordinated way. [passage omitted]

**New Oil Field in Pearl River Estuary**  
40100056a Beijing CHINA DAILY in English  
21 Jun 89 p 1

[By staff reporter Li Zhuoyan]

[Text] Guangzhou—A new oil field has been found at the mouth of the Pearl River in Southeast China's Guangdong Province, it was announced yesterday at a news conference hosted by the Nanhai East Oil Corp, CNOOC [China National Offshore Oil Corporation].

The oil field, designated LF22 1-2, was discovered by the joint group of Occidental Eastern Inc, the Anpol Exploration Ltd, the AGL Petroleum Company and the Repsol Exploration Corp.

Tests show that a well drilled at the site will have a potential daily output of 1,500 tons.

Oil exploration in the Pearl River mouth was started in 1983. So far, 17 fields have been found with a total oil deposit of about 360 million tons.

Over 31 percent of the drilled wells have been found to contain high grade oil.

"All these oil fields are high-yield and have a high daily output," said Chen Sizhong, chief geologist of Nanhai East, organizer of the Pearl River project.

Two fields—HZ21-1 and HZ26-1—have received State approval to start a regular production next year with an estimated total output of 400,000 tons. This will be the first oil produced in the area.

Five other fields are being evaluated and results will be known by the end of this year.

The project is being carried out by the joint efforts of six foreign operator groups formed by petroleum development companies from the U.S., Britain, Canada, Australia, Japan, Italy and Spain.

"Our foreign partners have been very co-operative," Chen said.

None of the more than 100 foreign experts had left during the last two months' unrest and work went on as usual.

"This is because these companies have a long-term benefit in the project and they have a firm confidence in China's open policies," Chen said.

**Gas Field Exploitation in Central and Southern Sichuan**

40130097b Chengdu SICHUAN RIBAO in Chinese  
6 Apr 89 p 1

[Article by Qu Yongzhi [1448 3057 1807]: "China Searches for Large Gas Pools in Central and Southern Sichuan, 10 Groups Win Bids for Prospecting and Research"]

[Text] Contracts of intention to solicit bids for 10 natural gas prospecting scientific research projects, including one for research on a comprehensive evaluation and prospecting program for the transitional zone from central Sichuan to southern Sichuan, were signed in Chengdu on 26 March 1989. Sichuan Province's inclusion by the China Petroleum and Natural Gas Corporation among the first group of regions to explore for large gas pools has opened a new page in gas pool development in Sichuan.

Although natural gas prospecting and development have grown gradually in recent years in China, no large gas pools have been found, they are quite insufficient for development of the national economy and social demand. To change this situation, besides organizing normal prospecting and development, the China Petroleum and Natural Gas Corporation has concentrated specific forces to focus on research to evaluate principles and goals of large gas fields and provide a basis for new deployments. After repeated debate by experts, the China Petroleum and Natural Gas Corporation decided to make Sichuan and the Ordos Basin the first regions to explore for large gas pools. During the last third of March, the corporation held a special bid invitation meeting in Chengdu for prospecting research projects to search for large gas fields. The meeting was attended by 18 bid submitting groups from nearly 30 prospecting regions, institutions of higher education, or special research organs. Selections were made via fair competition and 10 bidding groups made bids. The research results must be submitted prior to 1 October 1990, and will mainly provide a program for gas field prospecting deployments during the Eighth 5-Year Plan.

**Construction of Nuclear Plants Proceeds on Schedule**

**Daya Bay Plant**

40100056b Beijing CHINA DAILY in English  
20 Jun 89 p 2

[By staff reporter Xu Yuanchao]

[Text] Construction of China's first commercial nuclear power plant, at Daya Bay in South China's Guangdong Province, is proceeding on schedule. The containment dome of its first nuclear reactor will be topped in September.

The Electricite de France and Framatome of France and General Electric Company of Britain, the main contractors of the Daya Bay project, are expected to send more than 30 experts to Shenzhen for a regular co-ordinating meeting to be held today, said an official from the China National Nuclear Corporation (CNNC).

He Jiacheng, chief engineer of the CNNC Nuclear Power Department, told CHINA DAILY that work on the 1,800-megawatt nuclear power project was not affected by the unrest in Beijing in early June.

He said none of the 300 foreign experts and Hong Kong employees working at the Daya Bay construction site had left there.

He said there are more than 800 people at the site, including family members. They are from France, the United States, Britain, and Hong Kong. He expressed his appreciation for their contribution to China's modernization drive.

He also said that the Guangdong Nuclear Power Joint Venture Company and the Shenzhen municipal government had helped greatly in persuading those people from leaving the country.

"Now the morale of our foreign experts is calm," he said.

**Qinshan, Daya Bay Plants**

40100057b Beijing CEI Database in English 23 Jun 89

[Text] Hangzhou (CEI)—Construction of the Qinshan nuclear plant in Zhejiang Province and Daya Bay nuclear plant in Guangdong Province is proceeding as scheduled.

Jiang Xinxiang, general manager of the China Nuclear Industrial Corporation, said the scheduled pace will be strictly followed.

He added that foreign cooperation in nuclear industry and China's goal to extract 6 million kW of power from nuclear plants by the end of the century will not be changed.

According to the general manager, 5,000 Chinese workers and 800 foreign experts at the Daya Bay plant have stayed at their posts during the unrest in Beijing. A coordination conference with experts from France and Britain scheduled for June 19 in Shenzhen took place as planned, he said.

Meanwhile, construction at Qinshan is also going well. The Sino-foreign talks for 600,000 kW of generators in the second stage will continue later in the month.

### New Dachen Island Energy System

#### Discussion Conference

40130097a Beijing RENMIN RIBAO [OVERSEAS EDITION] in Chinese 19 May 89 p 3

[Article by Dong Fang [2639 2455]: "The New Dachen Island Energy System Generates Over 1 Million kWh Yearly"]

[Text] The Chinese-European Cooperative New Dachen Island Energy System (DES) International Discussion Conference was held in Jiaojiang City in early May 1989. A total of 74 people from economic and social circles in the Asian and Pacific region, directors from the European side of the Chinese-European Dachen Project, and the relevant leaders, experts, and scholars from China attended the meeting. The conference conscientiously summarized and discussed new energy resource development and utilization on Dachen Island.

The new energy resource project on Dachen Island is a demonstration project which involves free assistance from the European Economic Community and involves Chinese-European cooperation. EEC members and China's State Science and Technology Commission have deliberated and discussed this project since 1984, and the contractual agreement was formally signed in December 1986. Actual construction began in July 1987. In May, August, and November 1988, three sub-projects were completed, respectively, for the Upper and Lower Dachen seafloor cable network; terrestrial satellite reception, television transposer, and solar energy battery applications systems; and wind-powered electricity generation. Some 400,000 kWh of electricity was generated by the end of 1988.

Since Dachen Island became a Chinese-European new energy resource development and utilization demonstration island, the amount of power now generated annually has grown to 1.2 million kWh. In the winter of 1988 and spring of 1989, the island's seven deep sea fishing vessels had sufficient power for fishing communications and freezing fish, and suffered no losses. Township and town enterprises have grown from two in 1986 to seven now, and three are under construction. In 1988, the island's gross value of industrial and fishery output was 24.2 million yuan, a 2.1-fold increase over 1985. The people of Dachen, who formerly were unable to watch TV, now can receive four separate programs from Central People's Television Station Channel 1 and Channel 2, and the provincial and city channels. Upper and Lower Dachen now have electricity supplies day and night. Economic development on Dachen has attracted many Dachen natives from Taiwan to return to the island for a visit. Over 40 people from Taiwan came to Dachen in 1988 to visit relatives. They were extremely interested in implementing international cooperation projects on the island and indicated a willingness to work to develop Dachen Island.

Delegates to the meeting also spent 5 days on an inspection visit to Dachen Island. The unanimous view was that development and extension of the new energy resource demonstration project on Dachen Island had far-reaching modern and historical significance, and that it had excellent social, economic, and environmental results.

#### Project Progress

40130103 Beijing KEJI RIBAO in Chinese 21 May 89 p 3

[Article by Wu Yikang [0702 6318 1660], State Scientific and Technological Commission member and director of the Department of International Cooperation]

[Excerpts] Editor's note: It is reported that construction on the first phase of the China-European Community Dachen Island New Energy Resource Complementary System Demonstration Project, an important scientific and technological project of China and the European Community, has, through the efforts of both sides, been completed. In early May, the State Scientific and Technological Commission and the European Community jointly convened the "Sino-European Dachen Island New Energy Resource Utilization Conference." To assist readers in understanding the origin and significance of this project, its content, and the state of progress, the project's benefits and the appraisals of Chinese and foreign specialists a paper by Wu Yikang, member of the State Scientific and Technological Commission and director of the Department of International Cooperation, was specially issued. It is hoped that readers will find it helpful.

The first phase of construction on the Dachen Island New Energy Resource Complementary System Demonstration Project of China and the European Community with the support of the State Scientific and Technological Commission and the Zhejiang Provincial Government and through the joint efforts of the responsible organizations and specialists on both the Chinese and European sides, is reported to have been completed. From 4 to 7 May 1989, the State Scientific and Technological Commission and the European Community jointly held the "Sino-European Dachen Island New Energy Resource Utilization Conference" at Jiaojiang City, Zhejiang Province. At the conference, Chinese and foreign representatives appraised the first phase of the Sino-European Dachen Island New Energy Resource Complementary System Cooperative Project from scientific and practical angles and offered meaningful ideas and suggestions for the furtherance of Sino-European cooperation in industrialization.

#### I. Project Origins and Significance

In October 1984, when the deputy general director of the European Community's General Department of Energy Resources accompanied by former Deputy Director of the State Scientific and Technological Commission

## SUPPLEMENTAL SOURCES

Comrade Yang Jun visited Zhejiang Province, the Zhejiang Provincial Science and Technological Commission first raised the suggestion of using Zhejiang Province's Dachen Island as a base for cooperation with the European Community in the development of a new energy resource demonstration project. In March 1985, two consulting specialists assigned by the European Community investigated Dachen Island. After nearly 2 years of feasibility studies and preliminary preparatory work by the Chinese and Europeans, in December 1986 both sides formally signed the Sino-European Dachen Island Complementary Energy Resource Demonstration Cooperative Project Agreement and in April 1987 and March 1988 twice signed this project's financial agreement.

Wind energy, ocean energy, biomass, solar energy and other forms of renewable energy are a kind of inexhaustible resource. In areas where conventional energy resources are in short supply and renewable resources are abundant, such as remote islands, the use of new energy sources to compensate for conventional energy shortfalls, the realization of a multi-energy complementary system, is a reliable way to improve the energy supply and demand problem.

China has over 6,000 sea islands, more than 400 of which are inhabited. Dachen Island is centrally located off the coast of Zhejiang. The entire township is composed of 17 islands with a total area of 14.6 square kilometers and is centered around the two islands of Upper Dachen and Lower Dachen. The resident population is about 8,000 and the distance from the mainland is about 29 nautical miles. The Dachen Island fishery is the second largest in Zhejiang. Dachen Island is far from the mainland and conventional energy resources are lacking on the island, which has seriously restricted the economic and social development of Dachen Island. Dachen Island is like the great majority of China's sea islands. It possesses abundant renewable energy resources, but because of a lack of technology and economic wherewithal these rich resources have long remained undeveloped and unexploited. International scientific and technological cooperation can have a stimulating role in China's development of new energy resource technology.

### II. Project Content and Progress

The China-European Community Dachen Island Complementary Energy Resource System is a major project in scientific and technological cooperation between China and Europe. The European side has provided cost-free 500,000 (European currency units) in feasibility study funding and 4 million (European currency units) in project execution costs. Included is a complete set of project equipment provided by the European side at no cost. The European side has successively dispatched several groups of highly experienced specialists from Belgium, Denmark, France, England, West Germany, and other countries to China to work, and has trained many Chinese technical and management personnel.

From the Central Government to the localities the Chinese side has invested a large amount of manpower and financial support. Through the joint efforts of both sides success has been achieved on the project's first phase.

The first phase has three subprojects:

1. The wind-powered generation and diesel unit system. This subproject includes two parts; one is the wind-powered generators and the wind-diesel control system and one is the wind-diesel testing center. The European side provided three 55-kilowatt wind-powered generating units from Denmark and one 280-kilowatt diesel unit. The Chinese side provided two domestic 20-kilowatt wind-powered generating units. For the wind unit testing center, the European side provided wind power testing instruments, wind unit testing equipment and related technology to carry out simulation and control concerning the existing wind-diesel system and meteorological conditions.
2. The television satellite area reception and solar battery television transposer systems. The European side provided a television transposer system. This system is supplied with electricity through solar batteries and has an electric power storage system. The Chinese provided a parabolic antenna. The television signal covers all of Dachen Island.
3. Submarine power cable. A 4-kilometer submarine cable supplied by Europe was laid to connect Upper and Lower Dachen Island in grid operation. Based on European training for Chinese technical personnel and through installation and debugging in cooperation with European specialists on-site at Dachen Island, the above three subprojects' installation and debugging were completed in May, June, and November of 1988 respectively. Operation is normal and satisfactory results have been obtained.

### III. Project Results

From the end of 1988 to March of this year, the wind-diesel system supplied by Europe has generated over 300,000 kilowatt-hours of electricity. Of this, the three 55-kilowatt wind units from Denmark generated over 100,000 kilowatt-hours. It is estimated that this year, wind units could generate 350,000-400,000 kilowatt-hours, making possible a savings of around 100 tons of diesel oil. Due to normal operation of the five Sino-European wind units, refrigeration plants have sufficient electrical power for production of ice and the electrical power requirements of the entire island's seven pairs of deep-sea fishing vessels for freezing of the season's catch have been ensured. The wind-diesel testing center has gathered and is continuing to gather a great deal of data on the operation of this wind-diesel system, and will produce a scientific appraisal to provide a foundation on which to carry out future expansion in similar areas. [passage omitted]

## SUPPLEMENTAL SOURCES

A submarine cable was laid between Upper and Lower Dachen Island ending a history of at most only 4 hours' supply of electric power per day on Upper Dachen Island. Now, electricity can be supplied morning and evening 24 hours a day.

Due to the establishment of the new energy source and conventional energy source complementary system, Dachen Island's power supply is gradually moderating. Island-wide, the number of village enterprises has increased from 2 in 1986 to 7, and 3 more are being planned. Previously, Dachen Island had only one fish meal plant, last year two more were set up. Production of high-quality fish meal is 500 tons, output value is 1.5 million yuan and profit is about 70,000 yuan. The original fish meal plant has undergone technological renovation and is cooperating with Shanghai in the production of pharmaceutical peptone. Output value is 800,000 yuan with profits of 100,000 yuan. Lower Dachen Island has carried out technological renovation of a boat repair facility. Originally, it was only able to repair two boats simultaneously. This has been developed into a capacity to do simultaneous repairs on eight boats. Annual income has increased by over 100,000 yuan. The economy of Dachen Island has already developed from its single fishing industry to many types of business centered on aquatic products processing. Last year industrial and fishing output value reached 24.20 million yuan. [passage omitted]

### IV. Project Appraisal

At this conference Chinese and foreign delegates, after observation and discussion of the project, without exception considered that the Chinese and European sides had, in their execution of the Dachen Island New Energy Resource Complementary System Project invested large amounts of funding and manpower, that the Chinese and European sides worked well in concert and that the coordination and management by each domestic department was also highly effective. Through the efforts of both sides the project's first stage progressed smoothly. The Dachen Island New Energy Resource System already has scope and its impact is obvious. It has altered the face of Dachen Island. Useful information and data has been obtained relevant to the new energy resource

exploitation demonstration. This is a successful project, a successful model of Sino-European scientific and technological cooperation. From China's point of view, the Dachen Island Project is in keeping with China's policy for new energy resource development of tailoring planning to local conditions, using multiple energy sources in complementary fashion and emphasizing benefit.

The success of the Dachen Island Project demonstration will provide a feasible route to energy resource exploitation for China's sea islands, agricultural, grazing and remote areas. China is a developing country, the application of European technology in China is a test of its sophistication, practicality and reliability. This can improve the suitability of European technology to the real conditions of developing countries while, at the same time providing lessons for other countries and developing countries. Through this project, China has also trained a large group of technical and management cadres. We have trained our own technical contingent and foreign affairs contingent and the Zhejiang Provincial Science and Technological Commission set up the Dachen Island Project Office especially for the execution of this project to coordinate domestic and foreign work and to provide experience in international project management systems.

Moreover, the delegates pointed out that the ultimate objective of the Dachen Island Project is to move through demonstration toward cooperation in commercialization and industrialization, the formation of production capacity of economic scale and to promote these achievements of advanced technology to the point at which they occupy markets on a larger scale. This will require that new energy resource products be both of high quality and low cost. At present, the construction cost of the demonstration system equipment is relatively high, therefore, progress in design and reduction of capital investment will be a major component of the next step in Sino-European industrialization cooperation. China's delegates pointed out that a portion of the final product of industrialization must be sold on international markets. It is hoped that the European Community will provide market research and economic assistance in international markets and spur the industry and commerce of the European Community member nations to cooperate with China. [passage omitted]

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